PROCESS FLOW DIAGRAMS MODELING TOOL FOR TRITIUM TRANSFERS BETWEEN DEMO DUAL- COOLANT LIPB/HE PRIMARY CIRCUITS & AUXILIARIES

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Tritium self-sufficiency demonstration is a major R&D milestone of tritium breeding technology towards fusion reactor DEMO. Today, self-sufficiency proofs can only supported and certitudes only be achieved by numerical modelling. Properly validated and benchmarked Flow Process Diagrams (FPD) modelling tools are necessary. They additionally serve to establish DEMO auxiliary system relevant design specifications and tritium operational ranges.

FPD balancing dynamically transferred T atoms below appm between Dual-Coolant LiPb/He primary circuits and auxiliaries have been developed based on TMAP7 and commercial software Aspen+. TMAP7 is 1-dimensional tool is the unique tritium transport modelling tool having ITER QA pedigree and Aspen+ is a largely qualified commercial software for chemical engineering modelling and design.

The PFD tool modularity, including simplified system design specifications permits system scale sizing analyses and reference operational ranges.

This work presents the FPD modelling tool bases Dual-Coolant LiPb/He primary circuits and auxiliaries DEMO scales providing operational runs of reference.

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